

Advantages for dip-net combination with partial weir or scaffold:

- Minimal fish handling would be required. Incidental bycatch could be immediately placed back into the river upstream of the fishing site.
- This type of fishing gear is inexpensive and easily repaired.

Disadvantages for dip-net combination with partial weir or scaffold:

- Dip-netting may be labor intensive and the CPUE may be low. Depending on the dipping height, dip-netting fish may be physically demanding.
- Cascading falls are scarce in the Okanogan basin.
- Captured fish may be injured while thrashing in the net or accidentally falling out of the net onto rocks or the scaffold.
- Construction of a weir may require additional permits.

4.2 Site Review and Selection

Several sites were identified as potential fishing areas based on geomorphology, flow, temperature trends, fish distribution, run timing, and access. It should be noted that the sites selected are based on general information about the location of adult summer/fall Chinook salmon in key areas of the basin. In the future, radio-tag studies on adult summer/fall Chinook salmon captured and released at Wells Dam would be used to better define fish behavior, holding areas, and geographic distribution.

4.2.1 Wells Dam Pool (Lake Pateros)

The Okanogan River is warmer than the Columbia River, creating a thermal barrier to migrating summer/fall Chinook salmon adults. It is hypothesized that this thermal barrier causes Okanogan bound summer/fall Chinook to hold in this area until stream temperatures drop. If this assumption is correct, a capture facility at this location may provide an easily accessible location to collect a major portion of the summer/fall Chinook run. Consequently, an attempt at broodstock collection will initially occur in Lake Pateros. Two locations and types of fishing gear may be suitable in Lake Pateros.

4.2.1.1 Floating Trap-Net

A floating trap-net will be fished in the Columbia River below the Okanogan River confluence. Fish are known to congregate in Lake Pateros in the deep channel along the west bank, prior to migrating up into the Okanogan River (Fig. 24). A pound net design would work well; the water is relatively deep and the current is moderate. Wells Dam operations cause the flow of water in this area to change direction daily. Consequently, the configuration would be similar to nets used in tidal areas, where the fish can enter the heart on either side of the lead net. A lead line will be attached to the west bank directing the fish into the trap. This gear requires the use of a boat. At this site, water depth and boat ramp access are adequate to support the use of a boat throughout the fishing season.



Figure 24. Lake Pateros looking downstream from Okanogan River confluence.

Prior to net design, substrate, water depths, and flow (direction and velocity) would be measured during various Wells Dam operations. Adult radiotelemetry data collected as part of initial monitoring would also be reviewed to assist placing the trap in the stream channel.

4.2.1.2 Fish Wheel

A potentially suitable fish wheel site occurs along the south shore of Lake Pateros between the HWY 17 Bridge and Chief Joseph Dam (Figures 25 and 26). There is a channel of fast-moving water between the south shore and a bedrock island. Both the south shore and the island provide suitable sites for attaching a fish wheel. The current may be fast enough to propel the fish wheel. Deploying a fish wheel at this site would require coordination with both Wells Dam and Chief Joseph Dam operators. Operations at Wells Dam fluctuate the water level in Lake Pateros up to five feet daily. Maximum and minimum water depths would need to be measured at this site prior to obtaining a fish wheel to determine the maximum heights of the baskets.

Chief Joseph Dam has several turbines, which are oriented perpendicular to the south shore (Figure 27). At times, only some of the turbines are operated. The flow pattern and velocity passing through the fishing channel varies depending upon which turbines are operated. Flow will be measured in the fishing channel under various turbine operations to determine the feasibility of a self-propelled fish wheel.

It should be noted that this site is located directly across the Columbia River from the proposed Chief Joseph Dam Hatchery (CJDH). Due to its close proximity to the hatchery and cooler water temperatures, collected fish could be transported to the hatchery site within just a few minutes of collection.



Figure 25. Fish wheel site at Lake Pateros looking upstream at Chief Joseph Dam. Fish wheel would be placed between the rock outcrop (at left) and the south shore (at right).



Figure 26. Fish wheel site at Lake Pateros looking downstream at Highway 17 bridge. Fish wheel would be positioned between rock outcrop (previous photo) and south shore (at left).



Figure 27. Chief Joseph Dam (streamnet.org).

4.2.2.1 Beach Seine

Beach seines will be used on the spawning grounds in the Okanogan River at multiple sites predominately upstream from Omak Creek, focusing on areas with good access and high spawning densities. General locations include the following areas: (1) between Omak and Okanogan, (2) between Janis Bridge (HWY 97/20) and Tonasket, and (3) between the Horseshoe Lake area and Zosel Dam (Figs. 28 and 29). Due to the assumed temporal spawning pattern, seining will occur in the most upstream sites first. These areas are suitable due to the relatively homogeneous cobble substrate, shallow water, and high aggregations of fish.

Spawning density is much lower in the lower portion of the Okanogan River, probably rendering beach seining less efficient. However, this portion of the river is typically utilized by later returning adults. Later returning adults are especially important to capture because the current Eastbank Hatchery program does not include this component of the run, and, therefore, the major focus of future broodstock collection efforts will be aimed at this component. There is an area between Monse Bridge and the railroad trestle where beach seining would be effective (pers. comm., C. Fisher, Colville Tribes).



Figure 28. Riffle below Zosel Dam, looking downstream.



Figure 29. Same riffle below Zosel Dam, looking across the Okanogan River.

4.2.2.2 Tangle Net

Diver set tangle nets will be allowed to drift through pools where fish congregate during their migration at several sites. A tangle net will be deployed in the lower Okanogan River in the vicinity of Monse Bridge to Lake Pateros (Fig. 30). After a rain event, tribal gillnet fishers were successful in capturing over 160 summer/fall Chinook and sockeye salmon from a single pool, fishing several nights over a two-week period (pers. comm., C. Fisher, Colville Tribes). Gillnet fishers will be contacted to assist in tangle net fishing in this area. This area has good boat and road access; there is a boat ramp below Monse Bridge.



Figure 30. Monse Bridge on the Okanogan River, looking east.

Above the Wells pool influence (RM 17, Rkm 27.4), potential sites are limited because pools are uncommon. Adult summer/fall Chinook salmon are known to congregate below McAllister Rapids (RM 45, Rkm 72) (Fig. 31) (pers. comm., M. Tonseth, WDFW). Pools below Janis Rapids (RM 51, Rkm 81) (Fig. 32) and McLoughlin Falls (RM 49, Rkm 79) (Fig. 33) may also be suitable tangle net sites. The latter two have good road access. However, the roads are private and would require landowner permission.



Figure 31. McAllister Rapids on the Okanogan River.



Figure 32. Janis Rapids on the Okanogan River. Potential fish wheel site along opposite shore and potential weir/dip-net site.



Figure 33. McLoughlin Falls on the Okanogan River looking from east shore.

4.2.2.3 Dip-Net Combination

A dip-net/weir combination may also be feasible at Janis Rapids (Fig. 32) or McLoughlin Falls (Figs. 34 through 36). At these locations, fish migrate through limited areas of the river. These areas could be further limited by installing temporary rock or picket weirs in portions of the river. Fish could then be dip-netted from the passage routes. While these sites have good road access, the roads are private and would require landowner cooperation.



Figure 34. McLoughlin Falls looking downstream from east shore.



Figure 35. McLoughlin Falls potential dip-net site.



Figure 36. Rock island in center of McLoughlin Falls, looking upstream.

4.2.2.4 Fish Wheel

A potentially suitable fish wheel site also occurs along the west shore of Janis Rapids (Fig. 32). There is a channel of fast-moving water between the west shore and a bedrock island. Both the shore and the island provide suitable sites for attaching a fish wheel. The current may be fast enough to propel the fish wheel. The water depth and flow will be measured in the potential fishing channel to determine the feasibility of a self-propelled fish wheel.

4.2.3 Similkameen River

The Similkameen River contains the coolest water in the Okanogan basin. Once adults pass the Okanogan River's thermal barrier, early returning summer/fall Chinook salmon migrate to the Similkameen River and hold in the cool pools below Enloe Dam falls. As temperatures decrease, the fish drop down into Similkameen spawning areas; some migrate downstream and back into the Okanogan River. Spawning activity general occurs late-September through mid-November. Fishing efforts will be concentrated in the river accordingly.

4.2.3.1 Beach Seine

Beach seines will be used on the spawning grounds in the 1.8 km of spawning habitat near Similkameen Pond (Fig. 37). This area is well suited due to the relatively homogeneous cobble substrate, shallow water, and extremely high aggregations of fish.



Figure 37. Riffle 150 yards upstream of Similkameen Pond, Similkameen River. This area has the highest density of redds in the entire Okanogan basin.

This area is overseeded; redd superimposition is a common problem. Removing some of the adults from the spawning grounds would benefit the fish allowed to spawn naturally and may improve egg survival. An adult holding tank may be constructed at the Similkameen Pond acclimation facility, which is equipped with a cooler source of well water. This site would allow captured adults to be securely held and gradually cooled prior to transfer to the Chief Joseph Dam Hatchery.

4.2.3.2 Dip-Net Combination

The area below Enloe Dam (~RM 6.6, Rkm 10.6), characterized by a series of cascading waterfalls over bedrock, is an ideal location for dip-netting from scaffolds (Figs. 38 and 39). Fish are known to congregate in the pools below the falls. The bedrock canyon is ideal for multiple scaffolds. There is road access to the area through Bureau of Land Management (BLM) lands.



Figure 38. Overview of Enloe Dam (streamnet.org).



Figure 39. Enloe Dam on the Similkameen River.